

# Coaxial cables

## 1 RF cable portfolio

Connectors	length	cable	conn. material	kink protection
N-Male to N-Male	30 cm	RM141	stainless steel	glued heat shrink
N-Male to N-Male	35 cm	RG 223/U	nickel plated brass	plastic sleeve
N-Male to N-Male	50 cm	RM141	stainless steel	glued heat shrink
N-Male to N-Male	75 cm	RG 58/U	nickel plated brass	plastic sleeve
N-Male to N-Male	75 cm	RG 223/U	nickel plated brass	plastic sleeve
N-Male to N-Male	75 cm	RG 142	stainless steel	Stainless steel armored cable, glued heat shrink
N-Male to N-Male	1 m	RM141	stainless steel	glued heat shrink
N-Male to N-Male	1.25 m	RG 223/U	nickel plated brass	plastic sleeve
N-Male to N-Male	3,12 m	RG 213/U	nickel plated brass	glued heat shrink
N-Male to N-Male	3 m	RG 142	nickel plated brass	plastic sleeve
N-Male to N-Male	5 m	RG 223/U	nickel plated brass	plastic sleeve
N-Male to N-Male	5 m	RG 213/U	nickel plated brass	glued heat shrink
N-Male to N-Male	10 m	RG 142	nickel plated brass	plastic sleeve
N-Male to SMA-Male	30 cm	RM141	stainless steel	glued heat shrink
N-Male to SMA-Male	35 cm	RG 223/U	N: nickel plated brass SMA: gold plated brass	N: plastic sleeve SMA: glued heat shrink
N-Male to SMA-Male	50 cm	RM141	stainless steel	glued heat shrink
N-Male to SMA-Male	75 cm	RG 58	N: nickel plated brass SMA: gold plated brass	N: plastic sleeve SMA: glued heat shrink
N-Male to SMA-Male	75 cm	RG 223/U	N: nickel plated brass SMA: gold plated brass	N: plastic sleeve SMA: glued heat shrink
N-Male to SMA-Male	75 cm	RG 142	stainless steel	Stainless steel armored cable, glued heat shrink
N-Male to SMA-Male	1 m	RM141	stainless steel	glued heat shrink
N-Male to SMA-Male	1.25 m	RG 223/U	nickel plated brass	plastic sleeve
N-Male to BNC-Male	35 cm	RG 223/U	nickel plated brass	plastic sleeve
N-Male to BNC-Male	75 cm	RG 58/U	nickel plated brass	plastic sleeve
N-Male to BNC-Male	75 cm	RG 223/U	nickel plated brass	plastic sleeve
N-Male to BNC-Male	1.25 m	RG 223/U	nickel plated brass	plastic sleeve
BNC-Male to BNC-Male	35 cm	RG 223/U	nickel plated brass	plastic sleeve
BNC-Male to BNC-Male	75 cm	RG 58/U	nickel plated brass	plastic sleeve
BNC-Male to BNC-Male	75 cm	RG 223/U	nickel plated brass	plastic sleeve
BNC-Male to BNC-Male	1.25 m	RG 223/U	nickel plated brass	plastic sleeve
BNC-Male to SMA-Male	35 cm	RG 223/U	BNC: nickel plated brass SMA: gold plated brass	BNC: plastic sleeve SMA: glued heat shrink
SMA-Male to SMA-Male	25 cm	RG 316/U	gold plated brass	glued heat shrink
SMA-Male to SMA-Male	30 cm	RM141	stainless steel	glued heat shrink
SMA-Male to SMA-Male	50 cm	RM141	stainless steel	glued heat shrink
SMA-Male to SMA-Male	75 cm	RG 316/U	gold plated brass	glued heat shrink
SMA-Male to SMA-Male	75 cm	RG 142	stainless steel	Stainless steel armored cable, glued heat shrink
SMA-Male to SMA-Male	1 m	RM141	stainless steel	glued heat shrink
SMA-Male to SMA-Male	1.25 m	RG 223/U	gold plated brass	glued heat shrink
SMA-Male to SMB-Female	75 cm	RG 316/U	gold plated brass	glued heat shrink

Table 1: RF cable variants

Part numbering scheme:

Connector\_Connector\_Length[cm]\_Cable type for armored test cables add Test

Examples: NMNM35RG223, NMNM75RG142Test

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## 2 Connector specifications

Parameters	N-male	SMA-male	BNC-male	SMB-female
Temp. range	-65 ~ + 125°C	-65 ~ + 125°C	-65 ~ + 125°C	-65 ~ + 125°C
Vibration	MIL-STD-202, Method 213	MIL-STD-202, Method 213	MIL-STD-202, Method 213	n.a.
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Frequency range	DC ~ 11 GHz	DC ~ 18 GHz	DC ~ 4 GHz	DC ~ 4 GHz
Working voltage	1000 V	335 V	500 V	335 V
Withstand voltage	2500 V	750 V	1500 V	1000 V
Center contact resistance	≤ 2 mΩ	≤ 3 mΩ	≤ 1.5 mΩ	≤ 6 mΩ
Outer contact resistance	≤ 1 mΩ	≤ 2 mΩ	≤ 1 mΩ	≤ 1 mΩ
Insulation resistance	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ	≥ 5000 MΩ
Insertion loss	≤ 0.15 dB @ 10 GHz	≤ 0.06 √(f(GHz)) dB	≤ 0.2 dB @ 3 GHz	≤ 0.3 dB @ 1.5 GHz
VSWR	≤ 1.3 @ 11 GHz	≤ 1.1 + 0.02f (GHz)	≤ 1.22	≤ 1.25 + 0.4f (GHz)
Durability (mating cycles)	≥ 500	≥ 500	≥ 500	≥ 500

Material	N-male	SMA-male	BNC-male	SMB-female
shell	brass, nickel plated / stainless	brass, gold plated / stainless	brass, nickel plated	brass, gold plated
contact pin	brass, silver plated	brass, gold plated	brass, silver plated	bronze, gold plated
elastic contact	n.a.	n.a.	n.a.	beryllium alloy, gold plated
socket	beryllium alloy, silver plated	beryllium alloy, gold plated	bronze, nickel plated	bronze, gold plated
insulator	PTFE	PTFE	PTFE	PTFE
Crimping sleeve	copper alloy, nickel plated	copper alloy, gold plated	copper alloy, nickel plated	copper alloy, gold plated
sealing	6146 silastic	6146 silastic	6146 silastic	6146 silastic

Table 2: connector specifications

Applicable standards: MIL-C-39012, CECC 22120, IEC 60169-8, RoHS 3

## 3 General cable specifications

Parameters	RG 58/U	RG 142	RG 213/U	RG 223/U	RG 316/U	RM 141
center conductor Ø	0.9 mm	0.94 ± 0.02 mm	2.26 ± 0.09 mm	0.9 ± 0.01 mm	0.51 ± 0.03 mm	0.93 ± 0.02 mm
center cond. material	tinned copper	silver plated copper	plain copper	silver plated copper	silver plated copper	silver plated copper
dielectric Ø	2.95 ± 0.1 mm	3 ± 0.05 mm	7.25 ± 0.18 mm	2.95 ± 0.1 mm	1.52 ± 0.05 mm	2.95 ± 0.05 mm
dielectric material	low density PTE	PTFE	low density PTE	low density PTE	PTFE	PTFE
braid	Ø 0.13x112	Ø 4.15 mm, double	Ø 0.18x192	Ø 4.2mm, double	1.95 ± 0.08 mm	3.68 ± 0.1 mm
braid material	tinned copper	silver plated copper	plain copper	tinned copper	silver plated copper	silver plated copper
sheath Ø	5 ± 0.1 mm	4.95 ± 0.15 mm	10.3 ± 0.18 mm	5.4 ± 0.1 mm	2.9 ± 0.1 mm	4.1 ± 0.1 mm
sheath material	PVC	FEP	PVC	PVC	FEP	FEP
min. bending radius	single: 25 mm repeated: 50mm	single: 30 mm repeated: 50 mm	single: 50 mm repeated: 100 mm	single: 26 mm repeated: 53 mm	single: 15 mm repeated: 50 mm	single: 12.7 mm repeated: 40 mm
impedance	50 ± 2 Ω	50 ± 2 Ω	50 ± 2 Ω	50 ± 2 Ω	50 ± 2 Ω	50 ± 2 Ω
capacitance	100 pF / m	96 pF / m	100 pF / m	100 pF / m	96 pF / m	95 pF / m
inductance	0.2µH / m	0.22µH / m	0.25µH / m	0.2µH / m	0.27µH / m	0.27µH / m
velocity ratio	66 %	70%	66 %	66 %	70%	70%
insulation resistance	5 GΩ km	35 GΩ km	10 GΩ km	5 GΩ km	1 GΩ km	1 GΩ km
center cond. res.	38 Ω / km	34 Ω / km	6 Ω / km	29 Ω / km	266 Ω / km	266 Ω / km
braid resistance	14 Ω / km	7.3 Ω / km	4.4 Ω / km	11 Ω / km	18 Ω / km	18 Ω / km
Dielectric strength	4 kV	5 kV	5.5 kV	5 kV	1 kV	2 kV
shielding effectiveness	typ. -56 dB/m	typ. -80 dB/m	< -57 dB/m	< -83 dB/m	< -52 dB/m	< -100 dB/m
frequency range	DC ~ 5.8 GHz	DC ~ 6 GHz	DC ~ 3 GHz	DC ~ 6 GHz	DC ~ 6 GHz	DC ~ 18 GHz

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Parameters	RG 58/U	RG 142	RG 213/U	RG 223/U	RG 316/U	RM 141
temperature range	-30°C ~ +70°C	-55°C ~ +165°C	-40°C ~ +85°C	-30°C ~ +80°C	-55°C ~ +165°C	-55°C ~ +200°C
max. power @100MHz	230 W	1250 W	1316 W	280 W	395 W	
max. power @400MHz	110 W	650 W	658 W	121 W	209 W	950 W
max. power @ 1 GHz	65 W	380 W	416 W	80 W	135 W	620 W
max. power @ 3 GHz		230 W		46 W	78 W	360 W
max. power @ 6 GHz		150 W		32 W	11 W	220 W
max. power @ 12 GHz						150 W
max. power @ 18 GHz						120 W
attenuation @100MHz	0.16 dB/m	0.15 dB/m	0.06 dB/m	0.17 dB/m	0.26 dB/m	0.11 dB/m
attenuation @400MHz	0.32 dB/m	0.3 dB/m	0.13 dB/m	0.33 dB/m	0.53 dB/m	0.23 dB/m
attenuation @ 1 GHz	0.57 dB/m	0.49 dB/m	0.23 dB/m	0.53 dB/m	0.89 dB/m	0.38 dB/m
attenuation @ 3 GHz	1.15 dB/m	0.9 dB/m	0.49 dB/m	0.98 dB/m	1.63 dB/m	1.08 dB/m
attenuation @ 6 GHz	1.69 dB/m	1.37 dB/m		1.49 dB/m	2.34 dB/m	1.08 dB/m
attenuation @ 12 GHz						1.66 dB/m
attenuation @ 18 GHz						2.16 dB/m

Table 3: general cable specifications

Applicable standards: IEC 60332-1, RoHS 3

### 4 Individual cable specifications

Connectors	length	cable	VSWR @ 3 GHz	ins. loss @ 3 GHz	ins. loss @ 6 GHz
N-Male to N-Male	35 cm	RG 223/U	≤ 1.2	≤ 0.7 dB	≤ 1.2 dB
N-Male to N-Male	75 cm	RG 58/U	≤ 1.2	≤ 1.3 dB	≤ 2 dB
N-Male to N-Male	75 cm	RG 223/U	≤ 1.2	≤ 1.1 dB	≤ 1.5 dB
N-Male to N-Male	75 cm	RG 142	≤ 1.12	≤ 0.8 dB	≤ 1.2 dB
N-Male to N-Male	3 m	RG 142	≤ 1.2	≤ 3.1 dB	≤ 4.8 dB
N-Male to N-Male	3,12 m	RG 213	≤ 1.25	≤ 2.6 dB	≤ 4.5 dB
N-Male to N-Male	5 m	RG 223/U	≤ 1.2	≤ 5.3 dB	≤ 7.5 dB
N-Male to N-Male	5 m	RG 213/U	≤ 1.25	≤ 4.7 dB	≤ 6.8 dB
N-Male to N-Male	10 m	RG 142	≤ 1.2	≤ 9.4 dB	≤ 14.8 dB
N-Male to SMA-Male	35 cm	RG 223/U	≤ 1.2	≤ 0.7 dB	≤ 1.2 dB
N-Male to SMA-Male	75 cm	RG 58	≤ 1.2	≤ 1.3 dB	≤ 2 dB
N-Male to SMA-Male	75 cm	RG 223/U	≤ 1.2	≤ 1.1 dB	≤ 1.5 dB
N-Male to SMA-Male	75 cm	RG 142	≤ 1.12	≤ 0.8 dB	≤ 1.2 dB
N-Male to BNC-Male	35 cm	RG 223/U	≤ 1.3	≤ 0.8 dB	
N-Male to BNC-Male	75 cm	RG 58/U	≤ 1.3	≤ 1.4 dB	
N-Male to BNC-Male	75 cm	RG 223/U	≤ 1.3	≤ 1.2 dB	
BNC-Male to BNC-Male	35 cm	RG 223/U	≤ 1.3	≤ 0.85 dB	
BNC-Male to SMA-Male	35 cm	RG 223/U	≤ 1.3	≤ 0.8 dB	
SMA-Male to SMA-Male	25 cm	RG 316/U	≤ 1.2	≤ 0.5 dB	≤ 0.9 dB
SMA-Male to SMA-Male	75 cm	RG 142	≤ 1.12	≤ 0.8 dB	≤ 1.2 dB
SMA-Male to SMB-Female	75 cm	RG 316/U	≤ 1.2	≤ 2.7 dB	

Connectors	length	cable	VSWR @ 8.5 GHz	ins. loss @ 6 GHz	ins. loss @ 8.5 GHz
N-Male to N-Male	30 cm	RM141	≤ 1.2	≤ 0.6 dB	≤ 0.7 dB
N-Male to N-Male	50 cm	RM141	≤ 1.2	≤ 0.8 dB	≤ 0.9 dB
N-Male to N-Male	100 cm	RM141	≤ 1.2	≤ 1.4 dB	≤ 1.6 dB
N-Male to SMA-Male	30 cm	RM141	≤ 1.18	≤ 0.5 dB	≤ 0.6 dB
N-Male to SMA-Male	50 cm	RM141	≤ 1.18	≤ 0.7 dB	≤ 0.8 dB
N-Male to SMA-Male	100 cm	RM141	≤ 1.18	≤ 1.3 dB	≤ 1.5 dB
SMA-Male to SMA-Male	30 cm	RM141	≤ 1.15	≤ 0.4 dB	≤ 0.5 dB
SMA-Male to SMA-Male	50 cm	RM141	≤ 1.15	≤ 0.6 dB	≤ 0.8 dB
SMA-Male to SMA-Male	100 cm	RM141	≤ 1.15	≤ 1.2 dB	≤ 1.2 dB

Table 4: individual cable specifications

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### 5 Kink protection

Refer to the corresponding kink protections in Table 1 and the photos below.

**Plastic sleeve:** applied for N-connectors and BNC connectors; RG 58U, RG142, RG223U



**Glued heat shrink:** applied for N-connectors, SMA and SMB connectors; RG213U, armored RG142, RG316U, RM141



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**Protection caps:** all connectors are equipped with protection caps



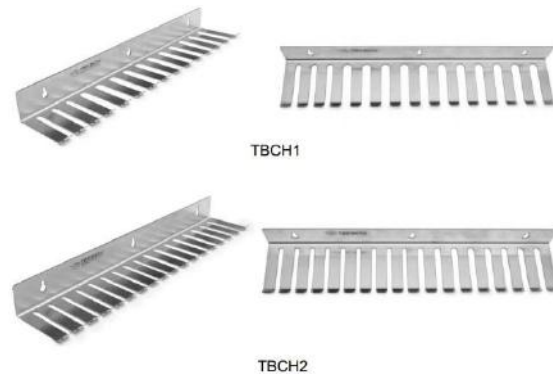
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### 6 Connector & cable care

#### Handling and storage:

Do not store connectors with the contact pins or threads exposed. All cable assemblies are supplied with protection end caps. Retain these caps and place it over the connectors whenever they are not in use, in order to protect it from dust and mechanical damage.

Do not store RF cable assemblies loose in a box or a bench drawer. Use cable holders such as offered by Tekbox, part # TBCH1, TBCH2.



Cable holders will keep the cable assemblies straight, which is far superior than coiling cables for storage. If coiling cannot be avoided, due to cable length, apply a proper method to avoid twisting and tangling:

- 1) Grab the cable and start with an overhand loop
- 2) Flip the cable, and roll it underhand to create the second loop
- 3) Repeat overhand and underhand until the cable coils entirely in a circle

Unroll coiled cable assemblies with above steps in reverse order. Ignoring proper coiling procedure will deform the cable cross section and distort the impedance.

### 7 Ordering Information

Connectors	length	cable	conn. material	Part #
N-Male to N-Male	30 cm	RM141	stainless steel	NM-NM/30/RM141
N-Male to N-Male	35 cm	RG 223/U	nickel plated brass	NM-NM/35/RG223
N-Male to N-Male	50 cm	RM141	stainless steel	NM-NM/50/RM141
N-Male to N-Male	75 cm	RG 58/U	nickel plated brass	NM-NM/75/RG58
N-Male to N-Male	75 cm	RG 223/U	nickel plated brass	NM-NM/75/RG223
N-Male to N-Male	75 cm	RG 142 armored	stainless steel	NM-NM/75/RG142/Test
N-Male to N-Male	1 m	RM141	stainless steel	NM-NM/100/RM141
N-Male to N-Male	1.25 m	RG 223/U	nickel plated brass	NM-NM/125/RG223
N-Male to N-Male	3,12 m	RG 213/U	nickel plated brass	NM-NM/312/RG213
N-Male to N-Male	3 m	RG 142	nickel plated brass	NM-NM/300/RG142
N-Male to N-Male	5 m	RG 223/U	nickel plated brass	NM-NM/500/RG223
N-Male to N-Male	5 m	RG 213/U	nickel plated brass	NM-NM/500/RG213

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N-Male to N-Male	10 m	RG 142	nickel plated brass	NM-NM/1000/RG142
N-Male to SMA-Male	30 cm	RM141	stainless steel	NM-SMAM/30/RM141
N-Male to SMA-Male	35 cm	RG 223/U	N: nickel plated brass SMA: gold plated brass	NM-SMAM/35/RG223
N-Male to SMA-Male	50 cm	RM141	stainless steel	NM-SMAM/50/RM141
N-Male to SMA-Male	75 cm	RG 58	N: nickel plated brass SMA: gold plated brass	NM-SMAM/75/RG58
N-Male to SMA-Male	75 cm	RG 223/U	N: nickel plated brass SMA: gold plated brass	NM-SMAM/75/RG223
N-Male to SMA-Male	75 cm	RG 142 armored	stainless steel	NM-SMAM/75/RG142/Test
N-Male to SMA-Male	1 m	RM141	stainless steel	NM-SMAM/100/RM141
N-Male to SMA-Male	1.25 m	RG 223/U	nickel plated brass	NM-SMAM/125/RG223
N-Male to BNC-Male	35 cm	RG 223/U	nickel plated brass	NM-BNCM/35/RG223
N-Male to BNC-Male	75 cm	RG 58/U	nickel plated brass	NM-BNCM/75/RG58
N-Male to BNC-Male	75 cm	RG 223/U	nickel plated brass	NM-BNCM/75/RG223
N-Male to BNC-Male	1.25 m	RG 223/U	nickel plated brass	NM-BNCM/125/RG223
BNC-Male to BNC-Male	35 cm	RG 223/U	nickel plated brass	BNCM-BNCM/35/RG223
BNC-Male to BNC-Male	75 cm	RG 58/U	nickel plated brass	BNCM-BNCM/75/RG58
BNC-Male to BNC-Male	75 cm	RG 223/U	nickel plated brass	BNCM-BNCM/75/RG223
BNC-Male to BNC-Male	1.25 m	RG 223/U	nickel plated brass	BNCM-BNCM/125/RG223
BNC-Male to SMA-Male	35 cm	RG 223/U	BNC: nickel plated brass SMA: gold plated brass	BNCM-SMAM/35/RG223
SMA-Male to SMA-Male	25 cm	RG 316/U	gold plated brass	SMAM-SMAM/25/RG316
SMA-Male to SMA-Male	30 cm	RM141	stainless steel	SMAM-SMAM/30/RM141
SMA-Male to SMA-Male	50 cm	RM141	stainless steel	SMAM-SMAM/50/RM141
SMA-Male to SMA-Male	75 cm	RG 316/U	gold plated brass	SMAM-SMAM/75/RG316
SMA-Male to SMA-Male	75 cm	RG 142 armored	stainless steel	SMAM-SMAM/75/RG142/Test
SMA-Male to SMA-Male	1 m	RM141	stainless steel	SMAM-SMAM/100/RM141
SMA-Male to SMA-Male	1.25 m	RG 223/U	gold plated brass	SMAM-SMAM/125/RG223
SMA-Male to SMB-Female	75 cm	RG 316/U	gold plated brass	SMAM-SMBF/75/RG316

Table 5: ordering information

## 8 History

Version	Date	Author	Changes
V1.0	5.8.2021	Mayerhofer	Creation of the document
V1.1	6.8.2021	Mayerhofer	Corrected cable length of SMA/SMA/RG316 to 25 cm
V1.2	12.11.2022	Mayerhofer	RM141 cables added